DEMAND MANAGEMENT METHODOLOGY FOR REGIONAL WATER CONSERVATION IMPLEMENTATION

LYNN HULME, WATER CONSERVATION COORDINATOR,
Sonoma County Water Agency, P.O. Box 11628, Santa Rosa, California 95406 USA

Sonoma County Water Agency and Retail Water Agencies

The Sonoma County Water Agency (Agency) was created by California state legislation and is empowered to produce and deliver potable water for municipal and industrial purposes; prevent the waste or diminution of water supplies; control and conserve flood and storm waters to reduce potential damage to life and property; provide sanitary sewage services; and provide recreational services in connection with flood control and water supply activities. The Agency operates under the direction of a Board of Directors that, for governance of the water supply system, consists of members of the Sonoma County Board of Supervisors.

The Agency delivers water on a wholesale basis to more than one half a million people from the San Francisco Golden Gate Bridge through the Sonoma County wine country. The eight primary water customers, collectively known as the water contractors and referred to in this paper as retail water agencies, consist of the cities of Santa Rosa, Rohnert Park, Petaluma, Cotati, and Sonoma; and the North Marin, Valley of the Moon, and the Forestville Water District. The Agency also delivers water to other customers including the Marin Municipal Water District and the Town of Windsor.

Current water deliveries (including water from local sources available to retail water agencies) average 56,000 - 62,000 acre-feet per year (AF/Y). The Agency projects that in the absence of any further conservation, total annual average contractor water sales, including unaccounted-for water, will increase from 62,000 AF per year today to 77,300 AF per year in 2005 and 83,300 AF per year in 2015. Currently, about 70 percent of the water needs are residential.

Introduction

Unique to the Agency is its hallmark dedication to its retail water agencies water conservation and water reuse programs. This paper will discuss the demand management methodology for regional water conservation implementation in these three areas:

1. How the Agency creatively worked with the retail water agencies request for additional water;
2. How the Agency and the retail water agencies met the challenge of a temporary impairment of the water transmission system during summertime demands; and,
3. The presentation of different strategies for working with the retail water agencies to implement cost-effect water conservation and reuse projects.

1. The Need For More Water

Our retail water agencies updated general plans forecast a need for additional water. This additional demand exceeds each retailer's water entitlement; therefore, the Agency was requested to increase the wholesale water supply.

Water supply definition expanded

The Agency expanded its definition of water supply to include not only surface water and groundwater but also water conservation and water reuse.

Engineering Analysis of Water and Wastewater Savings Potential

In 1995, the Agency commissioned the Montgomery Watson Water and Wastewater Efficiency/Avoided Cost Study (MW Study). The MW Study identified reasonable and potential water savings from implementing water conservation and recycled water projects. These reasonable and potential savings were used as the basis for estimating each retail water agencies water conservation and water reuse goals. An extensive database made up of the following components was compiled.

- Current and projected population and employment.
- Historical and projected water use by customer class.
- Future capital improvement plans that may be affected by additional conservation programs.
- Status of current conservation programs, documentation of water saved to-date, and options to conserve additional water.

This data was used to prepare a twenty year present worth analysis (1995-2015) of avoided costs due to implementation of additional conservation elements. This analysis considered the benefits due to deferral of:

- Water Agency and retail water agency O&M expenses.
- Water Agency water supply and transmission system expansion.
- Local wastewater infrastructure improvements.

The MW Study identified cost effective water conservation measures that projected water savings for each retail water agency.

TABLE 1
TOTAL COST PER MEASURE BY RETAIL WATER AGENIES (1995-2015)
PROJECTED SAVINGS (2015) AFY

MW STUDY PROGRAM ONE MEASURES AND URBAN WATER REUSE	**TOTALS IN DOLLARS/ AF/Y**
System Water Audits, Leak Detect. & Repair cost: ***Projected Savings: AF/y***	**$1,304,500** ***20***
Metering cost: ***Projected Savings AF/y:***	**$4,959,600** ***900***
Large Landscape water Audits cost: ***Projected Savings AF/y:***	**$2,492,400** ***>330***
Residential Water Audits cost: ***Projected Savings AF/y:***	**$742,800** ***>150***
Commercial/Industrial/Public Incentives for Irrigation System upgrades cost: ***Projected Savings AF/y:***	**$218,300** ***>20***
Low Water Use Landscape Ordinance cost: ***Projected Savings AF/y:***	**$589,400** ***>570***
Commercial/Industrial/ **Public Indoor water Audits:** ***Projected Savings AF/y:***	**$715,900** ***>60***
Commercial/Industrial **/Public Outdoor water audits:** ***Projected Savings AF/y:***	**$2,071,100** ***>150***

Water Efficient landscaping & Irrigation System **Incentives cost:** ***Projected Savings AF/y:***	 **4,012,300** ***>950***
Ultra Low-Flush Toilet Replacement cost: ***Projected Savings AF/y:***	**$8,742,200** ***1,140***
Incentives For commercial/ Industrial/Public Toilet/Shower Replace. cost: ***Projected Savings AF/y:.***	**$1,430,300** ***>2,530***
Urban Reuse cost: ***Projected Savings AF/y:***	**$15,200,000** **>2,074**
TOTAL ESTIMATED COST - **PROGRAM ONE AND URBAN WATER REUSE:**	 **$42,478,800**
POTENTIAL SAVINGS, AF/Y -PROGRAM ONE AND URBAN WATER REUSE:	***>8,900***
TOTAL IDENTIFIED WATER SAVINGS AF/Y: ***Note: All costs are in 1995 dollars.***	***6,600***

Establish Water Saving Goals

The MW Study concluded that 6,600 acre-feet of water per year could be reasonably saved through implementation of water conservation programs. Through successful negotiation and cooperation with the Agency, the retail water agencies agreed collectively to achieve a combined water savings goal of 6,600 acre-feet of water per year by the year 2015. The Agency and its retail water agencies committed to achieving the 6,600 acre-feet of water savings by reducing the contractual water entitlements to reflect these savings. The Agency then developed a Water Conservation Plan that is used as a guide to achieving this water savings goal.

The WCP is implemented under terms of agreements between the Agency and each retail water agency. The WCP provides retail water agencies with a funding mechanism and guidelines for implementation of the water conservation provisions of the 2000 Agency's Master Water Supply Agreement. These guidelines are tailored to the needs of each retail water agencies' service area.

Conservation is an integral part of both the Agency's and the retail water agencies' long-term resource planning. The WCP proposes to implement any cost-effective measures and/or any other measures that would help to achieve the water savings. Both the Agency and retail water agencies seek to actively encourage effective use and preservation of local water resources through this WCP.

Self-Sustainable Funding mechanism

The Agency's water conservation and water reuse programs are self-sustainable. Annually over a ten year period, the Agency planned to co-fund local and regional water conservation programs with a $2 million budget. The funds are distributed to the retail water agencies in proportion to their water entitlements. Through individual agreements, $1.5 million (collectively) goes directly to the retail water agencies to share in the cost of BMP water conservation program implementation and $0.5 million funds the Agency's regional water conservation program.

The funding amounts available to each retail water agency are detailed in Table 2 - 1, Water Contractor's Funding. Each retail water agency's total available funding is based on their percentage of water entitlement under the 2000 Master Water Supply Agreement. Each retail water agency determines the water conservation measures to implement for their service areas, and then individual funding agreements are prepared by the Agency each fiscal year.

Table 2
Water Contractor's Funding

Retail Water Agencies	Water Entitlements (AFY)	Water Entitlement %	Total Available Funding 1998-2008 (in dollars)
City of Santa Rosa	29,100	40%	$6,037,344
North Marin Water District	14,100	20%	$2,925,311
City of Petaluma	13,400	19%	$2,780,083
City of Rohnert Park	7,500	10%	$1,556,017
Valley of the Moon District	3,200	4%	$663,900
City of Sonoma	3,000	4%	$622,407
City of Cotati	1,520	2%	$315,353
Forestville Water District	480	1%	$99,585
Total	72,300	100%	$15,000,000

2. Water Transmission System Is Temporary Impaired

December 7, 1999 the Agency's Board of Directors adopted a resolution declaring that the wholesale water transmission system would continue to be temporarily impaired during summertime for approximately 5 years. The Agency's water production would be limited to an average monthly capacity of 84 millions of gallons per day (mgd). A new water collector and connecting pipeline are expected to achieve an average of 92 mgd of delivery capacity of the transmission system when they are built and in operation, expected to be by the summer of 2004.

MOU between the Agency and Retail Water Agencies

To solve summer and other peak period water transmission capacity problems, the Agency and water retailers collaborated on and formalized a "Memorandum of Understanding (MOU) Regarding Water Transmission System Capacity Allocation During Temporary Impairment." This MOU included a requirement for each retail water agency, as well as the Agency, to join the California Urban Water Conservation Council by becoming signatory, and thereby commit to implementing Best Management Practices (BMPs) of urban water conservation.

Figure 2
California Urban Water Conservation Council
Best Management Practices List

Best Management Practices (BMPs)	Retail Water Agency	Wholesale Agency
BMP 01: Water Survey Programs for Single-Family and Multi-Family Residential Customers.	†	
BMP 02: Residential Plumbing Retrofit	†	
BMP 03: System Water Audits, Leak Detection, and Repair	†	†
BMP 04: Metering with Commodity Rates for all New Connections and Retrofit of Existing	†	

BMP 05: Large Landscape Conservation Programs and Incentives	†	
BMP 06: High-Efficiency Washing Machine Rebate Programs	†	
BMP 07: Public Education Programs	†	†
BMP 08: School Education Programs	†	†
BMP 09: Conservation Programs for CII Accounts	†	
BMP 10: Wholesale Agency Assistance Programs		†
BMP 11: Conservation Pricing	†	†
BMP 12: Conservation Coordinator	†	†
BMP 13: Water Waste Prohibition	†	
BMP 14: Residential ULFT Replacement Programs	†	

The highest peak demand recorded by the Agency during the summer months of 1999 was 81 mgd. Although year-to-year increases in peak demand are highly variable due to fluctuations of summer weather, the historic average annual increase in peak demand historically has been 2 mgd. The water production capacity of the transmission systems may be exceeded during summer months if peak demand continues to increase, as it has historically.

Engineering Analysis of Potential Urban Water Reuse Sites

In 1999, the Agency prepared the "Preliminary Assessment of Urban Water Reuse, Sonoma County Water Agency Area, Sonoma County and Marin County, California" report. The report identified $42 million in potential recycled water projects. Feasibility and environmental studies need to be done for these projects.

Local Supply/Recycled Water and Tier 2 Water Conservation Program

Under the Local Supply/Recycled Water/Tier 2 Water Conservation Funding Program (LRT2 Program), the Agency plans to appropriate and distribute funds to the retail water agencies for implementing water conservation measures, developing recycled water projects that offset potable water use, and developing standby local peak-month production capacity that reduces demand on the Agency's water transmission systems.

Self-Sustaining Funding Mechanism

The retail water agencies supported the inclusion of $13 million dollars over a ten-year period from 2001/2002 through 2011/2012. The Agency may budget up to $2 million per year for the LRT2 program.

3. Working Together with Retail Water Agencies

The Agency believes its high standard of customer service is accomplished by assisting its retail water agencies with the following:

- ? When mutually agreeable, the Agency operates all or part of the conservation-related activities for the retail water agencies.
- ? When cost-effective and mutually agreeable, the Agency implements conservation programs regionally for all retail water agencies.

- ? Agency provides technical support by conducting or funding workshops addressing calculating BMP program savings and cost-effectiveness and program development.
- ? Agency helps the retail water agencies with understanding and complying with federal and state laws regarding water reuse and conservation.

Collaboration at Policy and Implementation Levels

The Agency collaborates at a policy level with its eight retail water agencies through the Water Advisory Committee (WAC). The WAC includes city and district managers, council and board members and senior level staff.

In addition to its work with the WAC, Agency staff collaborates at a program implementation level through the North Coast Water Conservation (NCWC) group. The NCWC group includes conservation coordinators and specialists, and is an information clearing-house for current issues, regional program coordination and events.

Implementing Water Conservation Program on an Individual and Regional Level

The Agency provides staff to assist four of the retail water agencies in applying conservation practices and programs specific to their service area. These programs are based on the CUWCC BMPs.

In addition to the locally operated programs, the Agency operated water conservation programs are implemented regionally when cost-effective and include preparation of the Urban Water Management Plans, the residential washing machine rebates, pre-rinse spray nozzle installation for restaurants, school and public education, training seminars and media outreach.

Agency's Urban Water Management Plan

The UWMP 2000 is a Water Supply Document required every five years by the State of California Water Code for water agencies that are bigger than 3,000 connections or deliver more than 3,000 acre-feet of water per year. The Department of Water Resource's interest in the plan is that it improves statewide water planning.

The regional UWMP 2000 was prepared upon request of the Agency's retail water agencies. The UWMP 2000 describes the availability of water and discusses water supply and demand comparisons; reliability planning; water shortage contingency planning; wastewater treatment and recycling; and water conservation activities.

The Agency coordinated development of the UWMP 2000 with staff from each retail water agencies, as well as several providers of wastewater treatment including the Santa Rosa Sub-regional Wastewater System, Petaluma Wastewater Treatment Facility, Novato Sanitary District, Sonoma Valley County Sanitation District and Forestville County Sanitation District.

In the process of updating the UWMP 2000, over two dozen workshops were made to community and public interest organizations, such as: neighborhood associations, service groups, business leaders, local environmental groups, the landscape industry, and agricultural growers' associations. Prior to adopting the UWMP 2000, the Agency made the UWMP 2000 available at each of the retail water agencies public hearings prior to approval and plan adoption.

Installation of Pre-rinse Nozzles in Restaurants

The Agency coordinates a regional pre-rinse hose nozzle program for most of our retail water agencies. The Agency operates under an agreement with CUWCC. The program is co-funded by the California Public Utilities Commission (CPUC), through funds collected by the Public Goods Charge, and participating water agencies throughout California:

- ? CPUC Funding = $131.19 per installed valve
- ? Participating Retail water agency = $50.00 per installed valve

CUWCC has contracted with an implementation vendor, Honeywell DMC Services, Inc. to perform the marketing, outreach, project procurement and installation of the spray valves as well as database administration and customer service. Overall program management, technical support and measurement and verification will be handled by the CUWCC.

The scope of the work is to provide direct installation of 390 water and energy efficient pre-rinse spray valves (1.6 gallons per minute) in food service establishment throughout California at no cost to the business or property owner.

The average water and wastewater savings achieved by replacing a pre-rinse nozzle in a restaurant is 1.1 acre-feet over the 5-year lifetime of the nozzle. The average water and wastewater savings achieve per day is 100 to 300 gallons per day depending on the size of the restaurant and the hours of operation. The Agency's is expecting to save 429 acre-feet of water over a 5-year lifetime of the nozzle and 39,000 to 117,000 gallons per day.

Washing Machine Rebate Program

The Agency coordinates a regional residential clothes washing machine rebate program for eight of our retail agencies. The Agency contracts with Electric Gas Industries Association (EGIA) to facilitate the point of purchase advertising, rebate printing and processing, and rebate payments to customers. Customers are rebated between $75 and $150 per Energy Star rated and applications are available at the appliance store where the machines are purchased.

Since 1998, the Agency has rebated over 4,500 Energy Star rated washing machines for our retail agencies. With an estimated savings of 5,100 gallons per washer per year, these 4,500 washers save approximately 70 acre-feet per year in our region.

School Education Program

The Water Education Program is designed to help Sonoma County educators teach students (from kindergarten through 8th grade) the "value" of water as an important natural resource and to promote water conservation and stewardship of our watershed. The program includes classroom instructional presentations, field study opportunities, teacher trainings and workshops, free curriculum materials aligned with the California State Frameworks, a lending library of videos, interactive models and printed materials, production of a newsletter for teachers and endorsement, participation and financial sponsorship of events, assemblies and workshops. All of these programs and materials are free to teachers in the retail water agency's service area.

Classroom Instructional Program and Field Study Program: Certain grade levels are offered a field study experience and some grades a classroom instructional program. Each grade level lesson has a subject-specific focus that supports the newly revised (2000) California Science Standards, and is designed to be developmentally appropriate.

Curriculum Materials: Curriculum materials are available for all grade levels. Water Education Program packets with order forms are distributed in September to all schools in the service area for the teachers to request education materials.

Teacher Workshops: During the 2001 –2002 school year, a total of 42 teachers participated in our workshops: 10 teachers in a six-hour Project Wet workshop; 16 teachers in a two-hour "make and take" water cycle workshop; 8 teachers in a two-hour pollution prevention workshop; and 8 teachers at a Watershed Awareness workshop held at the Earth, Space and Astronomy Symposium at the Sonoma County Office of Education.

Approximately 6262 students (a total of 264 classrooms) requested our printed education materials. An additional 865 students were reached through 43 classroom instructional presentations. We also had

932 students (37 classrooms from 24 schools) participate in our field study program. The total number of students reached during the 2001-2002 school year was 8053.

Conclusion, Demand Management Methodology for Regional Water Conservation Implementation

Water conservation and recycled water are invaluable tools that the Agency utilizes to address problems related to water supply, water transmission and resource management. The demand management methodology for regional water conservation implementation is built on a foundation of shared vision, communication and cooperation with our retail water agencies. Together, we are breaking new ground in implementing cost-effective water conservation and water re-use programs in the Sonoma County Water Agency and the customers it serves.

Background on Sonoma County

For the last four years, Sonoma County has been rated as one of the best places for businesses by Forbes Magazine, USA. Sonoma County is geographically located in the North San Francisco Bay area, and includes nine cities within its borders. Sonoma County's success is based on its stable and productive economy against the backdrop of beautiful vineyards, redwoods and miles of Pacific Ocean coastline. Sonoma County is one of the fastest growing counties in the state. In 1997, its economy outpaced the San Francisco Bay Area in almost every major sector. A more sustainable but healthy performance is expected for future years as the wine industry, high tech manufacturing and newly resurgent housing industries provide adequate balance to carry the current economic expansion forward.

Population and Demographics

Sonoma County's population reached 471,041 residents as of January 1, 2002. Over the past nine years, the population has increased by 63,391 residents, or 16 percent.

Employment and Labor

In 2001, Sonoma County job growth slowed dramatically as the local economy sank into recession. Local companies created 3,800 jobs in 2000, the smallest number since 1995. Local economists predict job growth will rise 2.1 percent in 2003. Unemployment is predicted to hit 3.8 percent in 2003.

Commercial Real Estate

Sonoma County's residential real estate values are once again climbing to record highs even as other parts of the economy remain weak or are making a slow recovery. April 2002 home resales were up a record 55 percent and the median price rose to a record $375,000, an increase of 5.7 percent over April 2001. In the new-home market, the median price jumped to a record $400,250, up 20 percent in the past year.

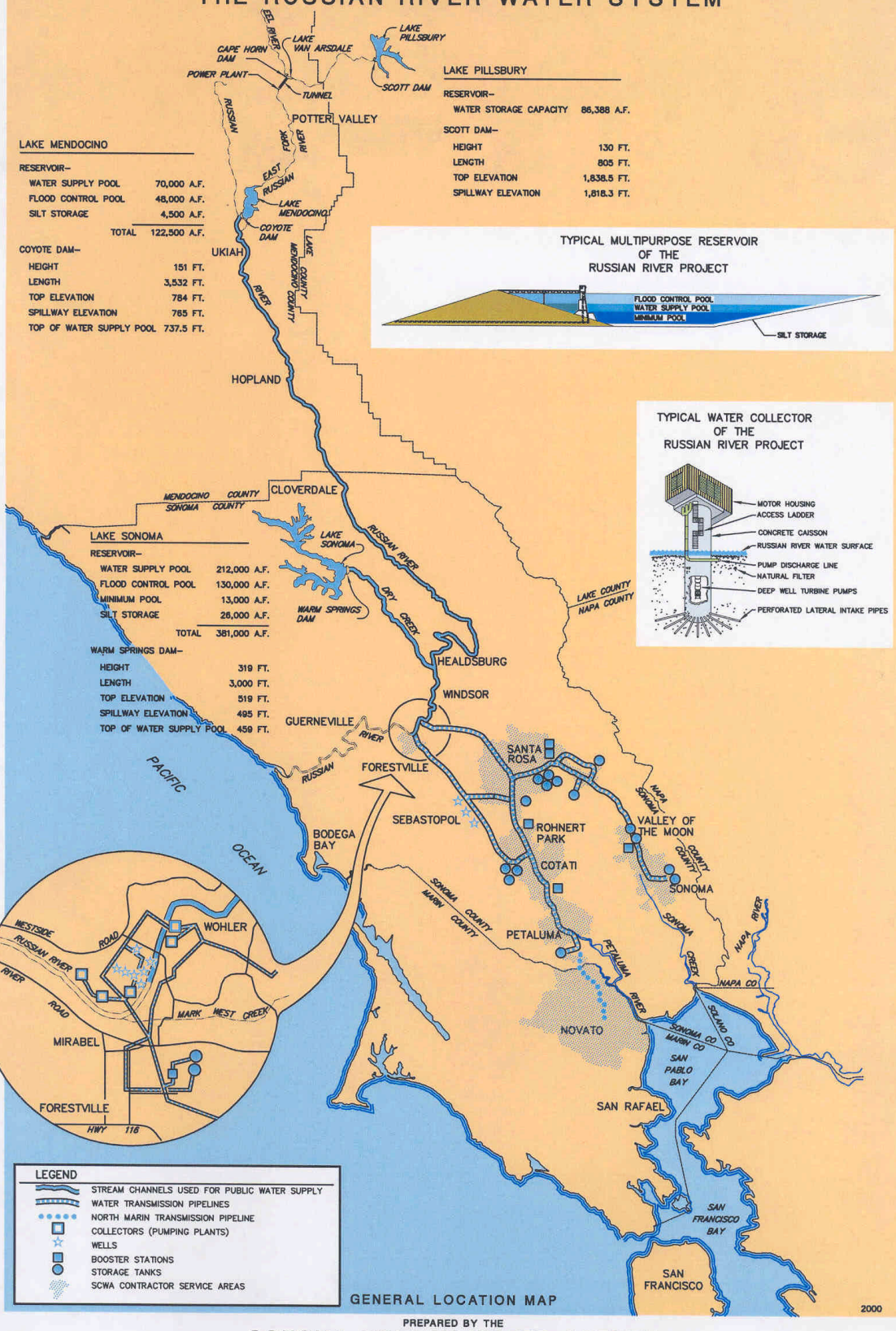
Housing

Sonoma County has the unique distinction of being one of the highest quality, lowest cost housing community in the San Francisco Bay Area. Homeowners occupy over 60% of all households.

Education

The Sonoma County area is a higher education center with the only four-year public University (Sonoma State) and the largest Junior College (Santa Rosa) in the four San Francisco North Bay counties. Excellent schools, low crime rates and beautiful surroundings all contribute to Sonoma County's high quality of life.

THE RUSSIAN RIVER WATER SYSTEM



LAKE MENDOCINO

RESERVOIR–

WATER SUPPLY POOL	70,000 A.F.
FLOOD CONTROL POOL	48,000 A.F.
SILT STORAGE	4,500 A.F.
TOTAL	122,500 A.F.

COYOTE DAM–

HEIGHT	151 FT.
LENGTH	3,532 FT.
TOP ELEVATION	784 FT.
SPILLWAY ELEVATION	765 FT.
TOP OF WATER SUPPLY POOL	737.5 FT.

LAKE PILLSBURY

RESERVOIR–

WATER STORAGE CAPACITY	86,388 A.F.

SCOTT DAM–

HEIGHT	130 FT.
LENGTH	805 FT.
TOP ELEVATION	1,838.5 FT.
SPILLWAY ELEVATION	1,818.3 FT.

LAKE SONOMA

RESERVOIR–

WATER SUPPLY POOL	212,000 A.F.
FLOOD CONTROL POOL	130,000 A.F.
MINIMUM POOL	13,000 A.F.
SILT STORAGE	26,000 A.F.
TOTAL	381,000 A.F.

WARM SPRINGS DAM–

HEIGHT	319 FT.
LENGTH	3,000 FT.
TOP ELEVATION	519 FT.
SPILLWAY ELEVATION	495 FT.
TOP OF WATER SUPPLY POOL	459 FT.

TYPICAL MULTIPURPOSE RESERVOIR OF THE RUSSIAN RIVER PROJECT

TYPICAL WATER COLLECTOR OF THE RUSSIAN RIVER PROJECT

LEGEND

- STREAM CHANNELS USED FOR PUBLIC WATER SUPPLY
- WATER TRANSMISSION PIPELINES
- NORTH MARIN TRANSMISSION PIPELINE
- COLLECTORS (PUMPING PLANTS)
- WELLS
- BOOSTER STATIONS
- STORAGE TANKS
- SCWA CONTRACTOR SERVICE AREAS

GENERAL LOCATION MAP

2000

PREPARED BY THE
SONOMA COUNTY WATER AGENCY
2150 WEST COLLEGE AVENUE
SANTA ROSA, CALIFORNIA